THAT WHICH IS CLAIMED IS:

1. A process of fixing a tissue comprising:

providing a tissue comprising elastin;

fixing said tissue with a solution comprising a phenolic tannin; and

washing said tissue, thereby providing a fixed tissue having an elastin component substantially resistant to biodegradation.

2. The process of claim 1, wherein the tissue further comprises collagen, the process further comprising fixing the tissue with a solution comprising glutaraldehyde.

3. The process of claim 2, wherein the tissue is fixed with the solution comprising a phenolic tannin subsequent to the fixing of the tissue with the solution comprising glutaraldehyde.

4. The process of claim 1, wherein the tissue is xenograft tissue.

5. The process of claim 1, wherein the tissue is selected from the group consisting of pericardium, aortic arch, heart valve, and vena cava tissue.

6. The process of claim 1, in which the phenolic tannin is tannic acid.

7. The process of claim 6, in which the solution comprising tannic acid comprises tannic acid in a concentration between about 0.0001 g/100 ml solution and about 10 g/100 ml solution.

8. The process of claim 7, in which the solution comprising tannic acid comprises a buffer, the solution being at a pH of less than about 6.

9. The process of claim 1, wherein the tissue comprises at least about 10% elastin by weight.

10. The process of claim 1, wherein the tissue further comprises glycosaminoglycan polysaccharides, the process further providing a fixed tissue wherein the glycosaminoglycan polysaccharides are substantially resistant to biodegradation.

11. A process of forming a bioprosthesis comprising:

exposing a connective tissue to a solution comprising an effective amount of a phenolic tannin, thereby chemically fixing an elastin component of the tissue; and

incorporating the fixed tissue into a bioprosthesis.

12. The process of claim 11, further comprising exposing the connective tissue to an effective amount of glutaraldehyde.

13. The process of claim 11, wherein the step of incorporating the fixed tissue into a bioprosthesis comprises attaching the fixed tissue to a support structure.

14. The process of claim 13, wherein the support structure comprises a stent.

15. The process of claim 11, wherein the bioprosthesis is a bioprosthetic heart valve.

16. The process of claim 11, wherein the connective tissue is an anisotropic material exhibiting increased elasticity in a direction, the process further comprising orienting the anisotropic material within the bioprosthesis with the direction of increased elasticity in a specific orientation such that the tissue mimics the elastic characteristics of the natural tissue which it is replacing.

17. The process of claim 11, wherein the phenolic tannin is tannic acid.

18. The process of claim 17, in which the solution comprising tannic acid comprises tannic acid in a concentration between about 0.0001 g/100ml solution and about 10 g/100ml solution.

19. The process of claim 17, in which the solution comprising tannic acid comprises tannic acid in a concentration between about 0.3 g/100ml solution and about 1.0 g/100ml solution.

20. A fixed tissue comprising cross-linked elastin, wherein the elastin is cross-linked with a phenolic tannin cross-linking agent.

21. The fixed tissue of claim 21, further comprising cross-linked collagen, wherein the collagen is cross-linked with a glutaraldehyde cross-linking agent.

22. The fixed tissue of claim 21, wherein the tissue exhibits at least about 60% less calcification over time as compared to a similar tissue fixed with only a glutaraldehyde fixative.

23. The fixed tissue of claim 20, wherein the fixed tissue comprises at least about 10% elastin by weight.

24. The fixed tissue of claim 20, wherein the phenolic tannin cross-linking agent is tannic acid.

25. The fixed tissue of claim 20, wherein the fixed tissue has a temperature of thermal denaturation greater than about 70°C.

26. The fixed tissue of claim 20, wherein the fixed tissue has a temperature of thermal denaturation greater than about 80°C.

27. The fixed tissue of claim 20, wherein the fixed tissue exhibits less than about 20% degradation following exposure to elastase for a period of about 48 hours.

28. The fixed tissue of claim 20, wherein the tissue is selected from the group consisting of bovine and porcine tissue.

29. The fixed tissue of claim 20, wherein the tissue is selected from the group consisting of pericardium, aortic wall, heart valve, and vena cava tissue.

30. A bioprosthesis comprising:

a fixed tissue comprising elastin cross-linked with a tannic acid cross-linking agent; and

a support material attached to the fixed tissue.

31. The bioprosthesis of claim 30, in which the tissue has an elastin content of greater than about 10% by weight of the tissue.

32. The bioprosthesis of claim 30, in which the tissue further comprises collagen cross-linked with a glutaraldehyde cross-linking agent.

33. The bioprosthesis of claim 30, wherein the tissue is an anisotropic tissue.

34. The bioprosthesis of claim 33, wherein the anisotropic tissue exhibits greater stiffness in a first direction and greater elasticity in a second direction.

35. The bioprosthesis of claim 30, wherein the tissue is selected from the group consisting of pericardium, aortic wall, heart valve and vena cava tissue.

36. The bioprosthesis of claim 30, wherein the tissue is porcine vena cava tissue.

37. The bioprosthesis of claim 30, wherein the support material comprises a stent.

38. The bioprosthesis of claim 30, wherein the support material comprises a suture ring.

39. The bioprosthesis of claim 30, wherein the bioprosthesis is a bioprosthetic heart valve.

40. The bioprosthesis of claim 30, wherein the bioprosthesis exhibits at least about 60% less calcification over time as compared to a similar bioprosthesis in which the tissue is fixed with only glutaraldehyde.

41. A process for replacing a damaged cardiac valve comprising:

surgical removal of a damaged cardiac valve from the heart of a patient;

implantation of a bioprosthetic heart valve in the cardiac valve annulus, wherein the bioprosthetic heart valve comprises a fixed tissue comprising elastin cross-linked with a tannic acid cross-linking agent; and

attachment of the bioprosthetic heart valve to the tissue of the cardiac valve annulus.

42. The process of claim 41, wherein the tissue has an elastin content of at least about 10% by weight of the tissue.

43. The process of claim 41, wherein the tissue further comprises collagen cross-linked with a glutaraldehyde cross-linking agent.

44. The process of claim 41, wherein the bioprosthetic heart valve is a tricuspid heart valve.

45. The process of claim 41, wherein the bioprosthetic heart valve is a bicuspid heart valve.

46. The process of claim 41, wherein the tissue is selected from the group consisting of pericardium, aortic wall, heart valve, and vena cava tissue.